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At the tip of the tail they stand in the position of the caudal neuropodia and notopodia of errant annelids, but are not, as in them, constituted of palea, bristles, etc. In the anterior dorsal region of *Scyllium*, these bodies are in the position of neuropodia.

It will thus be seen that Mayer supplies a most important set of data which lend support to the views of Dohrn as to the meaning and origin of the median and paired fins, since that author has contended that the relations of these peripheral structures to the axis of the body are to be determined by the relations they bear to the myotomes which send out muscular buds into the fins, and not on the basis of the relations to the cartilaginous appendicular skeleton or spines, as held by most other morphologists.

The table which Dr. Mayer gives to illustrate the varying relations of the same metameric elements of the median fins to the point where the vertebral axis becomes diplospondylic are also of great interest, not only morphologically, but also taxonomically. For the first time in the history of the subject, in fact, we have presented in this paper a tabulated statement of what are the actual relations of the metameric elements of the vertical fins to the myotomes of the body and the sclerotomes and nerve-pairs of the axis in the principal families of Elasmobranchii. The paper also illustrates the perfection and resources of modern biological methods. It is to be regretted that the author does not give a brief summary of his results at the close of the paper.

These researches, it may be remarked in conclusion, also show that in *Scyllium* there is developed a posterior terminal, vermiform section of the embryo which corresponds to what the writer has called an opisthure. Though it is obvious that this opisthure is rudimentary and evanescent, as it soon becomes inconspicuous. Some of the Elasmobranchii, therefore, pass through what the writer has termed an archicerical stage.

The results reached by Dr. Mayer also afford important evidence in support of the archistome theory, published by the writer in this journal recently.¹—*John A. Ryder.*

BOWER AND VINES' PRACTICAL BOTANY.²—One of the significant signs of the times, so far as botany is concerned, is the multiplication of books which are designed to encourage the practical study of plants in the microscopical and physiological laboratories. A few years ago, such a thing as a laboratory manual for the guidance of the botanical student was unheard of; now we

¹ AMERICAN NATURALIST, November, 1885, pp. 1115-1121.

² *A Course of Practical Instruction in Botany.* By F. O. BOWER, M.A., F.L.S., Lecturer on Botany at the Normal School of Science, South Kensington; and SIDNEY H. VINES, M.A., D.Sc., F.L.S., Fellow and Lecturer of Christ's College, Cambridge, and Reader in Botany in the University. With a preface by W. T. THISTLETON DYER, M.A., C.M.G., F.R.S., F.L.S., Assistant Director of the Royal Gardens, Kew. Part I., Phanerogamæ-Pteridophyta. London, Macmillan & Co., 1885.

have half a dozen or more, each giving valuable and needed help to the young investigator. The latest of these manuals is the one now before us.

The book, we are told in the preface, is the outgrowth of work done in the Normal School of Science at South Kensington, during several years under Mr. Dyer, and afterwards to the present under Mr. Bower. Originating in this way, the book is not open to the objection of impracticability which so frequently may be brought against works of this kind, and the beginner may take it up with confidence that he is not asked to undertake that which for him is still impossible. A book which has *grown* into being is always helpful, and this will prove no exception to the rule.

There are in the beginning of the book a couple of introductory chapters in which are discussed briefly, and yet satisfactorily, the making of preparations—micro-chemical reagents, the general structure of the cell, the micro-chemistry and the micro-physics of the cell. Altogether, fifty-three pages are given to the foregoing topics.

In the succeeding pages are taken up first the Phanerogams and afterwards the Pteridophytes. The sunflower (*Helianthus annuus*) is taken very properly as the representative of the herbaceous, dicotyledonous angiosperms. This is followed by a study of the arboreal type represented by the elm (*Ulmus campestris*). The monocotyledons are principally represented by Indian corn (*Zea mais*). In the Gymnosperms the Scotch pine (*Pinus sylvestris*) is used for study. In each case, stem, leaf, root, flower and embryo are successively taken up and carefully studied. The same method is followed in the Pteridophytes, where Selaginella, Lycopodium, Aspidium and Equisetum represent the different types of structure.

The general plan of the work is the same as that of Huxley and Martin's well-known book, "Practical Instruction in Elementary Biology," and the faults of the present work are identical, as appear to us, with those of its forerunner. While such books are very useful, and while they are doubtless doing much to stimulate better work, we have long been of the opinion that altogether too much help is given in them to the pupil, and that he is not thrown often enough upon his own resources. It is true, of course, that in the laboratories of many teachers, books of this kind will not be used in such a way as to work to the disadvantage of the pupil, but in many other cases—in too many cases—they will be. In making these strictures upon the book, we would not be understood as criticising the method of study of which it is the outgrowth. As to that there can be but one opinion; but unless great care be taken by the teacher and pupil, the results originally obtained at South Kensington without the book will not be secured with it. The book must be used as a *general guide*, and

must not be blindly followed paragraph by paragraph and page by page. Its proper function is *suggestive*, and, if so used, it will prove of great value in the botanical laboratory.

We cannot omit commending the form which the publishers have given the book. The type, printing, paper and binding are excellent, the flexible covers being especially commendable.—*Charles E. Bessey.*

TORREY'S BIRDS IN THE BUSH.¹—This is a dangerous little book. Young naturalists who have chosen paths that are not those of song and color should avoid it, lest they also should, by its winsome sweetness, be charmed to become ornithologists. Birds appeal to other faculties beside those of the intellect. The musician, the poet, the painter, all find inspiration in the *oscines*. Perhaps this is the reason there is so much twaddle written about birds. Since there is an audience writers devoid of the artistic, poetical, or musical faculties pen a series of quasi-scientific meanderings, and send it forth as a bird-book. But Mr. Torrey loves bird-song and bird-beauty and tells his love in language remarkable for force and picturesqueness. The eleven chapters teem with the result of years of life among the birds, and the author has a quaint way of comparing bird-life and bird-ways with our own life and ways, without allowing the reader to forget that it is only a bird he is talking about. No heavier blow has been dealt the sparrow-hater than that given in the first chapter of this book. Though by no means a sparrow-lover, Mr. Torrey confesses that, in the space of the last seven or eight years, he has watched upon Boston Garden and Common some thousands of specimens, representing not far from seventy species. The author owns to the true aboriginal temperament—he loves to be out of doors, but hates out-of-door employment; this is the stuff ornithologists should be made of, plus eyes.

LOUIS AGASSIZ; HIS LIFE AND CORRESPONDENCE.²—The story of Agassiz's life, as here told, is an exceedingly attractive one, and we wish that a cheap edition of it could be published for the benefit of the youth of our country. The materials have been put together with much literary skill and judgment, the letters forming the larger part of the materials for the biography. To the American student who knew Agassiz, the first volume, relating to his boyhood, his youth at the universities, his early manhood as a collector and investigator, his life as a professor at Neuchatel, his correspondence with Humboldt, his nine summers spent in Alpine exploration—this volume will seem like a romance. To those who never saw this child of genius, the second volume, recounting his successful life in America, the land of his adoption, will be full of interest.

¹ *Birds in the Bush*. By BRADFORD TORREY. Boston, Houghton, Mifflin & Co.

² *Louis Agassiz—His Life and Correspondence*. Edited by ELIZABETH CARY AGASSIZ. Two volumes. Boston, Houghton, Mifflin & Co., 1885. 12mo. \$4.